



# Test Report: UHP-750-12

---

750W Slim Type with PFC Switching Supply

## ■ DESIGN VERIFY TEST

Output Function Test  
Input Function Test  
Protection Function Test  
Control Function Test  
Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test  
E.M.C. Test

## ■ RELIABILITY TEST

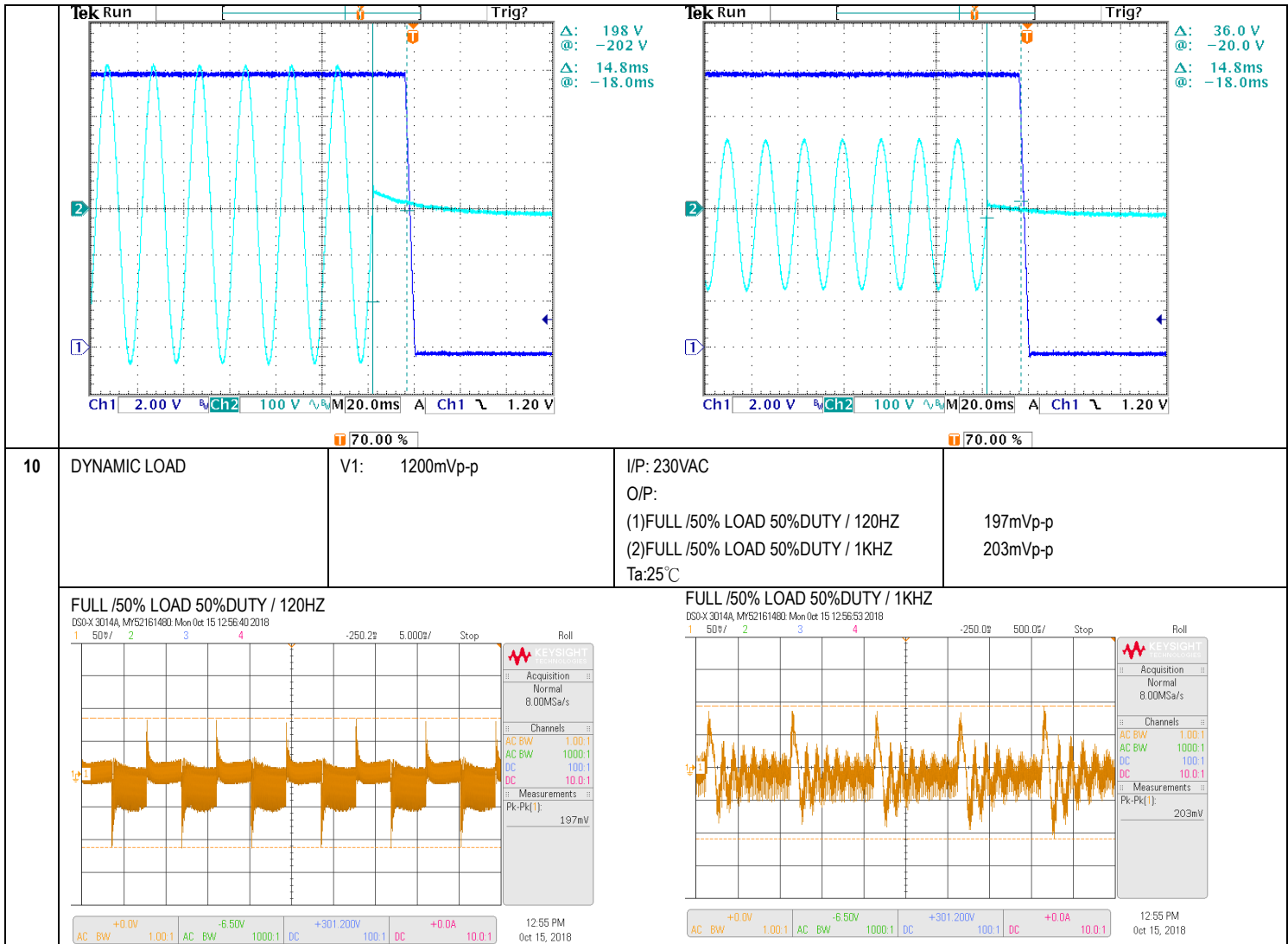
ENVIRONMENT TEST

## DESIGN VERIFY TEST

### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 12V~ 14.4V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	11.47V~14.85V/230VAC 11.47V~14.85V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: 1%~ -1%	I/P: 90VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: 0.165%~ -0.083 %
3	LINE REGULATION (Max)	V1: 0.5%~ -0.5%	I/P: 180VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: 0%~ 0 %
4	LOAD REGULATION(Max)	V1: 0.5%~ -0.5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.165%~ -0.083 %
5	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	<5%
6	RIPPLE & NOISE(Max)	V1: 150mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 81 mVp-p
<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p><b>high frequency :</b></p> </div> <div style="width: 45%;"> <p><b>low frequency :</b></p> </div> </div>				
7	SET UP TIME(Max)	230VAC/1000ms 115VAC/1000ms	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 75% LOAD Ta : 25°C	230VAC/ 380ms 115VAC/ 412ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage			INPUT=115VAC/60HZ @ 75% LOAD CH1 : Output Voltage CH2 : AC Input Voltage	

<p>8 RISE TIME (Max)</p>	<p>230VAC/50ms 115VAC/50ms</p>	<p>I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 75% LOAD Ta : 25°C</p>	<p>230VAC/ 14.8 ms 115VAC/ 16 ms</p>
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage</p>		<p>INPUT=115VAC/60HZ @ 75% LOAD CH1 : Output Voltage</p>	
<p>9 HOLD UP TIME (Typ.)</p>	<p>230VAC/12ms 115VAC/12ms</p>	<p>I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 75% LOAD Ta : 25°C</p>	<p>230VAC/ 14.8 ms 115VAC/ 14.8 ms</p>
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>		<p>INPUT=115VAC/60HZ @ 75% LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>	

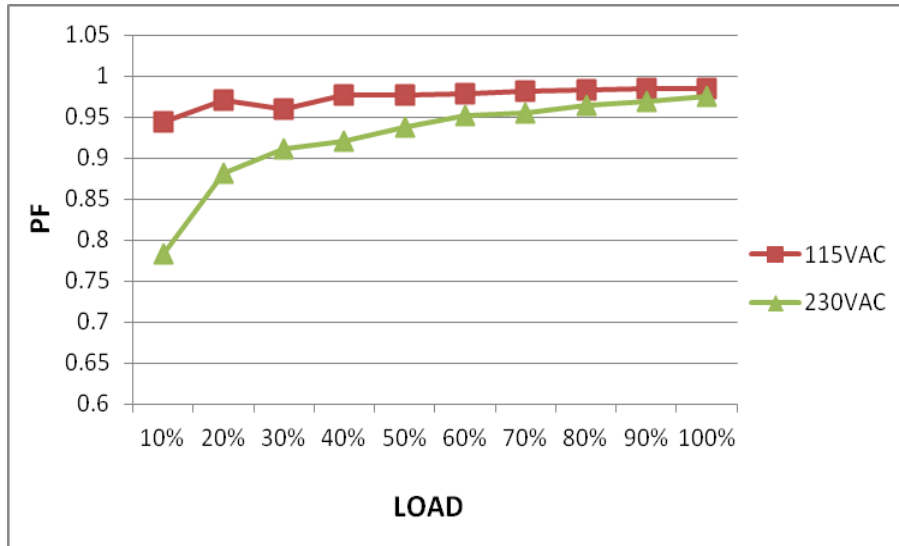


## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~264VAC	I/P: TESTING O/P: FULL LOAD Ta:25°C	76 V~264V
			I/P: LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P: FULL LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 90 VAC ~264 VAC O/P: FULL~MIN LOAD Ta:25°C	TEST: OK
3	INPUT CURRENT (Typ.)	230V/ 3.8 A 115V/ 7.5 A	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I=3.45A/ 230VAC I=7.08A/ 115VAC

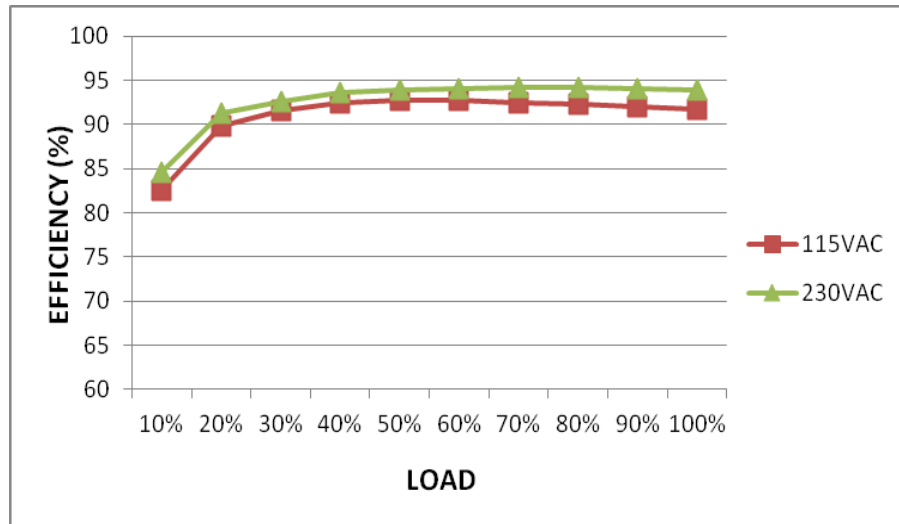
4	LEAKAGE CURRENT	< 0.75mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.36 mA N-FG : 0.38 mA
5	POWER FACTOR (Typ.)	0.95/ 230VAC 0.99/115VAC	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF=0.975/230VAC PF=0.991 /115VAC

P.F vs LOAD



6	EFFICIENCY(Typ.)	93.5%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	93.73 %
---	------------------	-------	---	---------

EFFICIENCY vs LOAD



7	INRUSH CURRENT(Typ.)	230V/40A 115V/20A COLD START	I/P : 230 VAC O/P : FULL LOAD I/P : 115 VAC O/P : 75% LOAD Ta : 25°C	I =24.3A/ 230VAC I =11.1A/ 115VAC T50= 1850us/230V
---	----------------------	------------------------------------	--	--

INPUT=230VAC/50HZ @ FULL LOAD  
CH2 : AC Input Voltage CH4 : Input current

INPUT=115VAC/ 60HZ @ 75% LOAD  
CH2 : AC Input Voltage CH4 : Input current

<p>8 NO LOAD CONSUMPTION ---</p>	<p>I/P : 115VAC I/P : 230VAC O/P : NO LOAD Ta : 25°C</p>	<p>6.08 W /115VAC 5.38 W /230VAC</p>

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 125% Protection type : Hiccup mode, recovers automatically after fault condition is removed	I/P: 264VAC I/P: 230VAC I/P: 180VAC O/P: TESTING Ta: 25°C	115.83%/ 264VAC 115.87%/ 230VAC 115.87%/180VAC Protection type : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	14.5V~16V Protection type : Shut down O/P voltage, re-power on to recover	I/P: 264VAC I/P: 230VAC I/P: 90VAC O/P: MIN LOAD Ta: 25°C	15.34V/ 264VAC 15.32V/ 230VAC 15.33V/ 90VAC PROTECTION TYPE : Shut down O/P voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	Protection type : Shut down O/P voltage, recovers automatically after temperature goes down	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD	O.T.P. Active Protection type : Shut down O/P voltage, recovers automatically after temperature goes down
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE Protection type : Hiccup mode, recovers automatically after fault condition is removed	I/P: 264VAC I/P: 90VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE PROTECTION TYPE : Protection type : Hiccup mode, recovers automatically after fault condition is removed

**CONTROL FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	DC OK CONTACT RATINGS	30VDC/1A RESISTIVE LOAD	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	TEST : OK

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q900 Rated 31A/ 650 V	I/P:High-Line +3V =300V AC ON/OFF VDS: O/P: (1)Full Load (2)Output Short (load) (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25°C	VDS: (1)457V (2)465V (3)465V (4)469V (5)465V (6)469V (7)489V
2	P.F.C Transistor ( D to S) or (C to E) <b>Peak Voltage</b>	Q1 Rated 31A/ 650 V	I/P:High-Line +3V =300V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25°C	VDS: (1)473V (2)445V (3)558V (4)493V (5)441V (6)497V (7)429V
3	P.F.C DIODE	D8 Rated 15 A/ 600 V	I/P:High-Line +3V =300V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25°C	(1) 457V (2) 429V (3) 465V (4) 481V
4	Diode <b>Peak Voltage</b>	Q100 Rated 74A/ 80 V  Q102 Rated 74A/ 80 V	I/P:High-Line +3V =300V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8).NO LOAD	Q100: (1)31.7V VDS: (2)6.6V (3)28.7V (4)28.7V (5)27.1V (6)26.9V (7)28.1V (8)26.3V  Q102: (1)35.7V VDS: (2)4.7V (3)30.8V (4)31.2V (5)31.2V (6)30.7V (7)30.3V (8)29.5V

			Ta:25°C	
5	Input Capacitor Voltage	C5 Rated: : 150μ/ 450 V Surge Voltage =500V	I/P:High-Line +3V =300V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta:25°C	(1)449V (2)441V (3)445V (4)437V
6	Control IC Voltage Test	PFC IC U1 Rated 10.5V~ 20V  PWM IC U2 Rated 8.85V~ 16 V  O/P IC U101 Rated 8V~ 24V	I/P:High-Line +3V =300V AC ON/OFF O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin(LOW LINE) Ta:25°C	U1 (1) 15.7V (2) 13.3V (3) 15.7V (4) 15.5V (5) 10.05V  U2 (1) 14.3V (2) 11.89V (3) 14.7V (4) 14.14V (5) 9.6V  U101 (1) 13.09V (2) 7.14V (3) 7.22V (4) 12.13V (5) 9.05V

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC/min I/P-FG :2KVAC/min O/P-FG:1.25KVAC/min	I/P-O/P: 4.125 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG:1.5KVAC/min Ta:25°C	I/P-O/P:5.41mA I/P-FG:4.98mA O/P-FG:4.33mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 30GΩ I/P-FG: 27GΩ O/P-FG: 21.2GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	18mΩ

### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
2	CONDUCTION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR: 8KV / Contact: 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A



6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare. Any contradictions of the test results, please refer to the latest EMC test report.			

## ■ RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																																																
1	TEMPERATURE RISE TEST	MODEL : UHP-750-12 (Operate with additional aluminum plate) 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=25°C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 45 °C																																																																																																																		
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=25°C</th> <th>HIGH AMBIENT Ta= 45°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>64.5°C</td><td>80.3°C</td></tr> <tr><td>2</td><td>LF3</td><td>53.1°C</td><td>72.6°C</td></tr> <tr><td>3</td><td>ZR1</td><td>45.5°C</td><td>65.6°C</td></tr> <tr><td>4</td><td>C10</td><td>61.0°C</td><td>77.9°C</td></tr> <tr><td>5</td><td>L2</td><td>72.9°C</td><td>99.0°C</td></tr> <tr><td>6</td><td>Q1</td><td>54.8°C</td><td>73.7°C</td></tr> <tr><td>7</td><td>Q900</td><td>75.9°C</td><td>99.7°C</td></tr> <tr><td>8</td><td>C426</td><td>59.5°C</td><td>82.1°C</td></tr> <tr><td>9</td><td>T1-1</td><td>83.2°C</td><td>114.0°C</td></tr> <tr><td>10</td><td>T1-2</td><td>84.0°C</td><td>113.4°C</td></tr> <tr><td>11</td><td>T2-1</td><td>81.1°C</td><td>109.3°C</td></tr> <tr><td>12</td><td>T2-2</td><td>89.2°C</td><td>120.8°C</td></tr> <tr><td>13</td><td>C120</td><td>67.2°C</td><td>93.2°C</td></tr> <tr><td>14</td><td>C126</td><td>60.5°C</td><td>84.8°C</td></tr> <tr><td>15</td><td>C251</td><td>66.5°C</td><td>91.6°C</td></tr> <tr><td>16</td><td>RY11</td><td>53.6°C</td><td>77.5°C</td></tr> <tr><td>17</td><td>TSW1</td><td>56.2°C</td><td>77.4°C</td></tr> <tr><td>18</td><td>C5</td><td>53.1°C</td><td>73.4°C</td></tr> <tr><td>19</td><td>RY1</td><td>54.2°C</td><td>72.6°C</td></tr> <tr><td>20</td><td>C920</td><td>57.7°C</td><td>79.3°C</td></tr> <tr><td>21</td><td>U1</td><td>50.0°C</td><td>69.7°C</td></tr> <tr><td>22</td><td>U101</td><td>66.6°C</td><td>95.5°C</td></tr> <tr><td>23</td><td>Q101</td><td>63.1°C</td><td>88.6°C</td></tr> <tr><td>24</td><td>Q103</td><td>63.4°C</td><td>88.6°C</td></tr> <tr><td>25</td><td>Q200</td><td>55.9°C</td><td>85.2°C</td></tr> <tr><td>26</td><td>Q202</td><td>63.0°C</td><td>84.5°C</td></tr> <tr><td>27</td><td>C410</td><td>68.9°C</td><td>91.3°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=25°C	HIGH AMBIENT Ta= 45°C	1	BD1	64.5°C	80.3°C	2	LF3	53.1°C	72.6°C	3	ZR1	45.5°C	65.6°C	4	C10	61.0°C	77.9°C	5	L2	72.9°C	99.0°C	6	Q1	54.8°C	73.7°C	7	Q900	75.9°C	99.7°C	8	C426	59.5°C	82.1°C	9	T1-1	83.2°C	114.0°C	10	T1-2	84.0°C	113.4°C	11	T2-1	81.1°C	109.3°C	12	T2-2	89.2°C	120.8°C	13	C120	67.2°C	93.2°C	14	C126	60.5°C	84.8°C	15	C251	66.5°C	91.6°C	16	RY11	53.6°C	77.5°C	17	TSW1	56.2°C	77.4°C	18	C5	53.1°C	73.4°C	19	RY1	54.2°C	72.6°C	20	C920	57.7°C	79.3°C	21	U1	50.0°C	69.7°C	22	U101	66.6°C	95.5°C	23	Q101	63.1°C	88.6°C	24	Q103	63.4°C	88.6°C	25	Q200	55.9°C	85.2°C	26	Q202	63.0°C	84.5°C	27	C410	68.9°C	91.3°C
NO	Position	ROOM AMBIENT Ta=25°C	HIGH AMBIENT Ta= 45°C																																																																																																																	
1	BD1	64.5°C	80.3°C																																																																																																																	
2	LF3	53.1°C	72.6°C																																																																																																																	
3	ZR1	45.5°C	65.6°C																																																																																																																	
4	C10	61.0°C	77.9°C																																																																																																																	
5	L2	72.9°C	99.0°C																																																																																																																	
6	Q1	54.8°C	73.7°C																																																																																																																	
7	Q900	75.9°C	99.7°C																																																																																																																	
8	C426	59.5°C	82.1°C																																																																																																																	
9	T1-1	83.2°C	114.0°C																																																																																																																	
10	T1-2	84.0°C	113.4°C																																																																																																																	
11	T2-1	81.1°C	109.3°C																																																																																																																	
12	T2-2	89.2°C	120.8°C																																																																																																																	
13	C120	67.2°C	93.2°C																																																																																																																	
14	C126	60.5°C	84.8°C																																																																																																																	
15	C251	66.5°C	91.6°C																																																																																																																	
16	RY11	53.6°C	77.5°C																																																																																																																	
17	TSW1	56.2°C	77.4°C																																																																																																																	
18	C5	53.1°C	73.4°C																																																																																																																	
19	RY1	54.2°C	72.6°C																																																																																																																	
20	C920	57.7°C	79.3°C																																																																																																																	
21	U1	50.0°C	69.7°C																																																																																																																	
22	U101	66.6°C	95.5°C																																																																																																																	
23	Q101	63.1°C	88.6°C																																																																																																																	
24	Q103	63.4°C	88.6°C																																																																																																																	
25	Q200	55.9°C	85.2°C																																																																																																																	
26	Q202	63.0°C	84.5°C																																																																																																																	
27	C410	68.9°C	91.3°C																																																																																																																	
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 113% LOAD Ta : 25°C	TEST : OK																																																																																																																
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/180VAC O/P : 100 % LOAD Ta= -35 °C	TEST : OK																																																																																																																

4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 45 °C NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 45 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/°C(0~45°C)	I/P : 230 VAC O/P : FULL LOAD	± 0 %/°C(0~45°C)
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : STATIC		OK
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C~ +45°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test		OK
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 5G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C120 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 45 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 45 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 45 °C LIFE TIME		(1) 161307HRS (2) 31580HRS (3) 96268HRS (4) 195855HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 833.9K hrs min. Telcordia SR-332 (Bellcore) ; 104.9K hrs min. MIL-HDBK-217F (25°C)		
11	Ongoing reliability test	I/P : 230VAC O/P : FULL LOAD TA=50 °C Demonstration Mean Time Between Failure : 30,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT TSENG

2018.4.30 GP-A50-F010